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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/672,544 | 09/26/2003 | Daniel R. Tretter | 200312433-1 | 4638 |

7590 11/24/2006

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| EXAMINER |
|---|
| HARRISON, CHANTE E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2628 | |

DATE MAILED: 11/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/672,544 | TRETTER ET AL. | |
| | Examiner | Art Unit | |
| | Chante Harrison | 2628 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. This action is responsive to communications: Pre-Appeal Conference Request, filed on 8/9/06.

2. Claims 1-20 are pending in the case. Claims 1, 8, 12 and 19 are independent claims.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over William Allen, US 2004/0027363 A1, 2/2004.

As per independent claim 1, Allen discloses receiving image data for a plurality of image frames (pp. 2, Para 29); generating at least one sub-frame for each image frame based on the received image data (pp. 2, Para 30); displaying the sub-frames for each image frame in a first set of the plurality of image frames at a first plurality of spatially offset positions (Fig. 18 "A-D"; pp. 7, Para 89); and displaying the sub-frames for each image

frame in a second set of the plurality of image frames at a second plurality of spatially offset positions that is different than the first plurality of spatially offset positions (Fig. 18 "E-H"; pp. 7, Para 92); and displaying a plurality of colors during the display of each of the sub-frames (pp. 5, Para 66).

Allen fails to specifically disclose sequential display of a plurality of colors.

It would have been obvious to one of ordinary skill in the art at the time of invention to include sequentially displaying a plurality of colors during each of the sub-frames with the method of Allen because Allen teaches pixels modulate RGB colors to display sub-frames for each image frame to produce a displayed image, where modulation of RGB colors results in the overlapping and temporally displayed subframes being displayed with color.

One of skill in the art would have been motivated to include sequentially displaying a plurality of colors during each of the sub-frames with the method of Allen for the advantage of reducing adverse display effects caused by gaps between the micro-mirrors of the light modulator.

As per dependent claim 2, Allen discloses the sub-frames for each image frame are displayed with a temporal offset (pp. 2, Para 30; pp. 3, Para 43).

As per dependent claim 3, Allen discloses the sub-frames for consecutive image frames are displayed at different pluralities of spatially offset positions (pp. 3, Para 42-43).

As per dependent claim 4, Allen discloses the first and the second pluralities of spatially offset positions each include two positions (i.e. a horizontally offset position and a vertically offset position) (pp. 3, Para 41; pp. 7, Par 91).

As per dependent claim 5, Allen discloses the first plurality of spatially offset positions includes a first position, and a second position diagonally offset from the first position in a first diagonal direction (pp. 4, Para 49; Fig. 18).

As per dependent claim 6, Allen discloses the second plurality of spatially offset positions includes a third position spatially offset from the first and the second positions, and a fourth position diagonally offset from the third position in a second diagonal direction that is substantially perpendicular to the first diagonal direction (Fig. 18).

As per dependent claim 7, Allen discloses the first and the second pluralities of spatially offset positions each include four positions (pp. 7, Para 91; pp. 8, Para 93; Fig. 18).

As per independent claim 12, Allen discloses means for receiving a set of consecutive high resolution images (Fig. 1; pp. 2, Para 29; pp. 3, Para 37); means for generating a plurality of low resolution sub-frames for each of the high resolution images (Fig. 1; pp. 3, Para 39-40); means for alternately displaying the low resolution sub-frames for each of the high resolution images at a set of spatially offset positions (Fig. 1; pp. 3, Para 41); and means for automatically varying the set of spatially offset positions for at least on e

of the high resolution images (Fig. 1; pp. 2, Para 31; pp. 7, Para 92); and means (Fig. 10 "26") for sequentially displaying a plurality of colors during the display of each of the low-resolution sub-frames (pp. 5, Para 66).

Allen fails to specifically disclose sequential display of a plurality of colors.

It would have been obvious to one of ordinary skill in the art at the time of invention to include sequentially displaying a plurality of colors during each of the sub-frames with the method of Allen because Allen teaches pixels modulate RGB colors to display sub-frames for each image frame to produce a displayed image, where modulation of RGB colors results in the overlapping and temporally displayed subframes being displayed with color.

One of skill in the art would have been motivated to include sequentially displaying a plurality of colors during each of the sub-frames with the method of Allen for the advantage of reducing adverse display effects caused by gaps between the micro-mirrors of the light modulator.

As per dependent claim 13, Allen discloses the means for varying is configured to vary the set of spatially offset positions such that the sub-frames for consecutive high resolution images are displayed at different sets of spatially offset positions (Fig. 18; pp. 7, Para 92).

As per dependent claim 14, Allen discloses the means for generating is configured to generate two sub-frames for each of the high resolution images (pp. 4, Para 54; pp. 8,

Para 92-94), and wherein the means for alternately displaying is configured to display the two low resolution sub-frames for each of the high resolution images at a set of two spatially offset positions (pp. 3, Para 42-43).

As per dependent claim 15, Allen discloses the means for varying is configured to vary the set of spatially offset positions such that the sub-frames for consecutive high resolution images are displayed at different sets of two spatially offset positions (pp. 3, Para 44; pp. 7, Para 92).

As per dependent claim 16, Allen discloses the different sets of two spatially offset positions include a first set and a second set, the first set including a first position, and a second position diagonally offset form the first position in a first diagonal direction (pp. 8, Para 96), the second set including a third position spatially offset from the first and the second positions, and a fourth position diagonally offset from the third position in a second diagonal direction that is substantially perpendicular to the first diagonal direction (Fig. 18; pp. 7, Para 92; pp. 8, Para 96).

As per dependent claim 17, Allen discloses the means for generating is configured to generate four sub-frames for each of the high resolution images (pp. 7, Para 89-90; pp. 8, Par 93), and wherein the means for alternately displaying is configured to display the four low resolution sub-frames for each of the high resolution images at a set of four spatially offset positions (pp. 3, Para 39-40 & 42).

As per dependent claim 18, Allen discloses the means for varying is configured to vary the set of spatially offset positions such that the sub-frames for consecutive high resolution images are displayed at different sets of four spatially offset positions (pp. 7-9, Para 91-93).

3. Claims 8-11 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over William Allen, US 2004/0027363 A1, 2/2004, and further in view of Thomas Willis et al., US 2004/0046752 A1, 3/2004.

As per independent claim 8, Allen discloses a buffer adapted to receive image data for first and second images (pp. 2, Para 29, 30); an image processing unit (pp. 2, Para 30) configured to define first and second sub-frames corresponding to the first image (pp. 7-8, Para 91-93), and define third and fourth sub-frames corresponding to the second image (pp. 7-8, Para 91-93); and a display device adapted to alternately display the first sub-frame in a first position (Fig. 18 "A") and the second sub-frame in a second position spatially offset from the first position (Fig. 18 "H"), and alternately display the third sub-frame in a third position spatially offset from the first position and the second position (Fig. 18 "E"), and the forth sub-frame in a fourth position spatially offset from the first position, the second position, and the third position (Fig. 18 "D"), wherein the display device is adapted to use a light modulator to represent different light intensities in the displayed sub-frames (pp. 3, Para 45; pp. 5, Para 66).

Allen fails to specifically disclose using pulse width modulation to represent different light intensities in the displayed sub-frames.

Willis discloses using pulse width modulation to represent different light intensities in the displayed sub-frames (pp. 4, Para 34-36).

It would have been obvious to one of ordinary skill in the art at the time of invention to include Willis' use of pulse width modulation to represent different light

intensities in the displayed sub-frames wit the method of Allen because Allen teaches using light modulation to represent different light intensities as he teaches a display device, which includes both an image shifter for temporally and spatially offsetting sub-frames (pp. 3, Para 43-44) and a light modulator that uses an array of micro mirror devices to modulate light (pp. 3, Para 45).

One of ordinary skill in the art would have been motivated to include Willis's use of pulse-width modulation to represent different light intensities with the method of Allen for the advantage of producing colors and driving digital pixels of the display.

As per dependent claim 9, Allen discloses the second position is diagonally offset from the first position in a first diagonal direction (Fig. 18 "H").

As per dependent claim 10, Allen discloses the fourth position is diagonally offset form the third position in a second diagonal direction that is substantially perpendicular to the first diagonal direction (Fig. 18 "D").

As per dependent claim 11, Allen discloses the image processing unit is configured to define a first set of four sub-frames corresponding to the first image (pp. 2, Para 30; pp. 5, Para 62 & 71), and define a second set of four sub-frames corresponding to the second image (pp. 8, Para 93), and wherein the display device is adapted to alternately display the first set of four sub-frames in a first set of four spatially offset positions (pp. 7, Para 92), and alternately display the second set of four sub-frames in a second set of

four spatially offset positions that is different than the first set of four spatially offset positions (pp. 7, Para 92).

As per independent claim 19, Allen discloses receiving a set of consecutive high resolution images (pp. 2, Para 29; pp. 3, Para 37); generating a set of low resolution sub-frames or each of the high resolution images (pp. 3, Para 39-40); alternately displaying the low resolution sub-frames for each of the high resolution images at a plurality of spatially offset positions (pp. 3, Para 41); and automatically varying the plurality of spatially offset positions for at least one of the high resolution images (pp. 2, Para 31; pp. 7, Para 92); and generating light pulses of varying widths to represent different light intensities in the displayed low resolution sub-frames (pp. 3, Para 45; pp. 5, Para 66).

Allen fails to specifically disclose using pulse-width modulation to represent different light intensities.

Willis discloses using pulse-width modulation (pp. 5, Para 45) to represent different light intensities (pp. 4, Para 34-36).

It would have been obvious to one of ordinary skill in the art to include Willis' use of pulse-width modulation to represent different light intensities with the method of Allen because Allen teaches a display device, which includes both an image shifter for temporally and spatially offsetting sub-frames (pp. 3, Para 43-44) and a light modulator that uses an array of micro mirror devices to modulate light (pp. 3, Para 45).

One of ordinary skill in the art would have been motivated to include Willis's use of pulse-width modulation to represent different light intensities with the method of Allen for the advantage of producing colors and driving digital pixels of the display.

As per dependent claim 20, Allen discloses the plurality of spatially offset positions are varied such that the sub-frames for consecutive high resolution images (pp. 2, Para 29; pp. 3, Para 37) are displayed at different spatially offset positions (pp. 7, Para 92).

***Response to Arguments***

4. Applicant's arguments, see pp. 1-4, filed 8/9/06, with respect to the rejection(s) of claim(s) 1-20 under 35 USC 102e have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Allen US 2004/0027363 A1 with respect to claims 1-7 and 12-18 and Allen in view of Willis et al., US 2004/0046752 A1 with respect to claims 8-11, 19 and 20.

Applicant argues Allen does not teach sequentially displaying a plurality of colors during the display of each of the sub-frames.

In response, Allen teaches pixels modulate RGB colors to display sub-frames for each image frame to produce a displayed image, where modulation of RGB colors results in the overlapping and temporally displayed subframes being displayed with color. Therefore, it is the interpretation of the Examiner that Allen teaches sequentially displaying a plurality of colors during the display of each of the sub-frames.

Applicant argues Allen does not teach a display device adapted to **use a pulse-width modulation** to represent different light intensities in the displayed sub-frames.

In response, Willis discloses using pulse-width modulation (PWM) (pp. 5, Para 45) that correspond to LUT, look up table, entries of colors for each pixel (pp. 4, Para

34-36), where the colors of each pixel represent different light intensities. Willis additionally teaches using PWM in a SLM, spatial light modulator, such as a projector, to drive pixels for display and produce color. It is obvious to include Willis' use of pulse-width modulation to represent different light intensities with the method of Allen because Allen teaches a display device, such as a projector, which includes both an image shifter for temporally and spatially offsetting sub-frames (pp. 3, Para 43-44) and a light modulator that uses an array of micro mirror devices to modulate light (pp. 3, Para 45). Therefore, it is the interpretation of the Examiner that Allen in view of the teachings of Willis teaches using pulse-width modulation to represent different light intensities in the displayed sub-frames

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chante Harrison whose telephone number is 571-272-7659. The examiner can normally be reached on Monday, Tuesday and Wednesday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on 571-272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Chante Harrison
Examiner
Art Unit 2628

Ch
November 14, 2006